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ABSTRACT

This study compared different strategies for computing sociometric status to determine the extent to which they agree. It is argued that, if the different strategies lead to significant differences in whether a child is classified as popular or unpopular, then the technique for computing social acceptance would be an important issue in interpreting studies of social skills and in clinical assessment. Only strategies using nomination or rating scale approaches were included because these have been most widely used with young children. Using photographs of their classmates, children ages 4 to 6 completed both a nomination and a rating sociometric task. Several strategies were then employed to compute sociometric rankings. In addition, teachers were asked to predict how children would be ranked by their peers. Children were ranked into either three categories (popular, unpopular, or middle) or four categories (popular, neglected, rejected, or middle) sociometric groups depending on the strategy employed. Kappa coefficients and percentages of agreement were then computed between the groupings yielded by the different strategies. While most of the kappa coefficients indicated agreement greater than chance, most of the actual percentages of agreement were below 50. This indicated that, at least for young children, which sociometric strategy is used may make a difference in how popular a child is judged to be. The report suggests that these findings imply that comparisons between studies using different strategies for computing peer acceptance must proceed with caution. (Author/DST)

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Agreement between Different Sociometric Strategies with Preschool Children[1]

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Running head: AGREEMENT BETWEEN SOCIOMETRIC STRATEGIES

Abstract

The purpose of this study was to compare several different strategies for computing sociometric status to determine to what extent they yielded similar rankings. If the different strategies that researchers have used lead to significant differences in whether a child is classified as popular or unpopular, then which technique for computing social acceptance is used would be an important issue in interpreting studies of social skills as well as in clinical assessment. Using photos of their classmates, 99 children between the ages of 4 and 6 completed both a nomination and a rating sociometric task. Several strategies that have been reported in recent research were then employed to compute sociometric rankings. In addition, teachers were asked to predict how children would be ranked by their peers. Children were ranked into either three (popular, unpopular, or middle) or four (popular, neglected, rejected or middle) sociometric groups depending on the strategy employed. Kappa coefficients and percentages of agreement were then computed between the groupings yielded by the different strategies. While most of the kappa coefficients indicated agreement greater than chance, most of the actual percentages of agreement were below 50%. This indicates that, at least for preschool children, which sociometric strategy is used may make a difference in how popular a child is judged to be.

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Agreement between Different Sociometric Strategies with Preschool Children

An initial step in studies of peer relations or social skills is to try to identify those children who are and those who are not liked or accepted by their peers. Unfortunately there has not been a clear consensus on the best strategy for assessing peer acceptance. Reviews of the literature on sociometric measures with preschool children (e.g., Asher & Hymel, 1981; Hops & Lewin, 1984; Hymel, 1983). reveal that several techniques have been used—with nominations, paired-comparisons and rating-scale measures being the most common. In studies that use the same technique, there is often quite a difference in how acceptance scores are actually computed. For example, some studies have weighted positive nominations scores giving a higher value to choices made early in the selection process while other studies have treated all nomination choices equally (Hymel, 1983). Positive and negative nomination scores by peers are considered separately in some studies while other researchers have combined these into social preference and social impact scores (e.g., Peery, 1979).

While there has been growing interest in determining the validity and stability of these measures, there is little data on to what extent different strategies yield different sociometric groupings. Hymel (1983) reports considerable lack of agreement between two systems that place children in one of four social acceptance groups using a combination of positive and negative peer nominations. She also reports considerable

inconsistency between preschool children's negative nominations and their ratings of peers ratings. However, others (such as Asher, Singleton, Tinsley, & Hymel, 1979; Goldman, Corsini, & DeUrioste, 1980) have reported significant correlations between nomination and rating scores.

While in the long run one's choice of a peer acceptance assessment strategy should be determined by the concurrent and predictive validity of different systems as well as theoretical considerations (Asher & Hymel, 1981; Hops & Lewin, 1984; Hymel, 1983), in the short run it would be important to know if which strategy one used made a significant difference in how children were classified. If it did make a difference in whether a child is classified as popular or unpopular, then this would be of importance both in trying to compare the findings of different studies and in identifying individual cases for clinical intervention.

The purpose of this study was to compare several of these different strategies for computing sociometric scores to determine to what extent they agreed with one another. Several strategies that have been reported in the recent literature were employed to compute sociometric rankings. Only those using nomination or rating scale approaches were included since these have been the most widely used with preschool children (see Asher & Hymel, 1981; Hops & Lewin, 1984; Hymel, 1983). Those using a nomination approach were: (a) number of positive nominations (as described by Connolly & Doyle, 1981; Goldman, Corsini, & DeUrioste, 1980; Hops & Lewin, 1984; Landau, Milich, & Whitten, 1984); (b) number of choices as best friend (as described by Asher & Hymel, 1981; Foster & Ritchey, 1979; Hops & Lewin, 1984); (c) a status score combining the

number of positive nominations with the number of negative ones (as described by Asher & Hymel, 1981; Foster & Ritchey, 1979; Goldman, Corsini, & DeUrioste, 1980); (d) combining above and below average most-liked and least-liked nominations to yield four popularity groups (as described by Dodge & Schlundt, 1983; Hops & Lewin, 1984); and, (e) combining above average and below average social preference and social impact scores to yield four groups (as described by Peery, 1979). Using the rating method, children were also grouped according to: (a) their mean score on the scale (as described by Asher, Singleton, Tinsley, & Hymel, 1979; Asher & Hymel, 1981; Foster & Ritchey, 1979; Hops & Lwein, 1984; Rubin & Daniels-Beirness, 1983); (b) a status score based on the number of placements in the smiling box minus placements in the frowning box (as described by Goldman, Corsini, & DeUrioste, 1980); and, (c) a combination of social preference and social impact scores based on placements in the high versus low boxes. In addition, teachers were asked to predict how children would be ranked by their peers.

Methods

Subjects. As part of a larger study on social acceptance and social cognition, 89 children from 7 preschool classes (3 different schools) were administered both nomination and rating sociometric tasks. This sample included 39 boys and 40 girls between the ages of 4 and 6 years (average age = 61.67 months (SD = 6.09), all of which had their parents' written permission to participate in this study.

Procedures. At the end of a session during which certain social cognitive abilities were assessed, each child was photographed using a color

Polaroid camera. In a second session, children were presented with the photos of all their classmates. The children were asked to name all the photos to make sure they were familiar with all the other children to be rated. They were asked to select the photo of a child they would like to play with most. This photo was removed and the child was asked to make another selection. This photo was in turn removed and the child was asked to make a third selection. All three photos were returned to the array and the procedure repeated with the request that the child select three children with whom they would least like to play. This was then repeated a third time asking them to select three children they would consider best friends. They were then asked to sort the photos of their classmates into three boxes—a smiling face for those who were fun to play with, a frowning face for those it was not fun to play with, and a neutral face for those in between the two extremes. Prior to both of these tasks, children were asked to make similar nominations and ratings for a group of pictures of toys as a training procedure.

Sociometric scoring. All children in each class rated all other children but only same-sex nomination and rating data were used in this study. This decision was based on reports that rankings from same-sex peers may be a more valid indicator of peer relationship problems than opposite-sex rankings (Asher & Hymel, 1981; Asher & Renshaw, 1981) and the fact that same-sex rankings seem to be the measure of social acceptance used in many studies with preschool children (e.g., Landau, Milich, & Whitten, 1984; Rubin & Daniels-Beirness, 1983).

For each child, the following scores were computed: (a) the number of positive nominations received; (b) the number of negative nominations; (c) the number of selections as best friend; (d) a status score or social preference score computed by subtracting the number of negative nominations from the number of positive nominations received; (e) a social impact score (the number of positive plus the number of negative nominations); (f) mean score on the rating scale; (g) number of positive ratings; (h) number of negative ratings; (i) a status score or social preference score based on subtracting the number of negative ratings from the number of positive ratings; and, (j) a social impact score based on the number of positive and negative ratings. To control for differences in class size and to allow combining data across the different classes, these scores were converted into standardized scores within each class. For each of these scores, "high" was defined as a z-score of at least +.5 and "low" as a z-score of -.5 or lower. Finally, teachers were asked to judge for each child whether they thought that child's peers would rate him or her high, low or in the middle in likeability and in terms of number of positive or negative nominations.

Children were ranked into either three (popular, unpopular or middle) or four (popular, neglected, rejected, or middle) popularity groups depending on the strategy employed (see Table 1).

Insert Table 1 about here.

The percent agreement between each pair of strategies was computed for all pairs yielding the same number of groups. Cohen's kappa coefficients of agreement were then computed between the different strategies which yielded the same number of groups. Kappa compares the degree of agreement between two raters of the same nominal data with that which one would expect from chance (Cohen, 1960; Fleiss, Cohen & Everitt, 1969).

Results

First a series of chi-square analyses was performed to see if there were any differences in the rankings as a result of birth order or sex or number of siblings. None of these analyses was significant. Another series of chi-squares was performed to determine the effects of sex on the rankings received. For one of the strategies (Liking) boys received higher rankings than did girls, $X^2 = 30.42$, $df = 2$, $p < .0001$. Boys were also more likely to receive extreme scores and girls more likely to receive middle scores on several of the strategies, i. e., Preference, $X^2 = 11.079$, $df = 2$, $p < .004$; Preference Placement, $X^2 = 8.756$, $df = 2$, $p < .013$; Status Score, $X^2 = 12.904$, $df = 2$, $p < .0003$; and, Play Status Scores, $X^2 = 8.756$, $df = 2$, $p < .013$. All of these strategies include a social preference score (positive choices minus negative choices). Perhaps boys receive more extreme social preference scores than do girls because boys are more likely to give each other extreme ratings while girls are more diplomatic in their judgments of their same-sex peers.

The percent agreements between the pairs of different strategies are generally low (see Tables 2 and 3). The highest level of agreement was 62.626% between Most Plays and Preference—both of which utilize the number of most-play nominations. The lowest of 35.4% was between Nominations and Status Scores—both of which use combinations of most and least-play nominations. None of the teacher estimates of peer rankings were more than 50% accurate.

Insert Tables 2 and 3 about here.

While the percent agreements are low, they seem in most cases to be greater than what one might expect due to chance alone (see Tables 4 and 5). More than half of the z-scores associated with the kappas for the different pairs of strategies are in excess of 1.96 and so could be considered statistically significant.

Insert Tables 4 and 5 about here.

Discussion

The low levels of agreement between the different sociometric measures is quite surprising given that the different strategies are all permutations of a few basic numbers. One might expect little agreement between strategies based on very different figures, such as liking ratings versus number of positive nominations. However, we found that even strategies that all used positive nominations or all used liking ratings

failed to agree much better than half the time on the placement of individual children in peer acceptance groups. It is also interesting to note how the method of computing agreement influences the conclusions one draws about the comparability of the methods. Simply reporting the kappa and related z-scores paints a picture of greater similarity between the techniques than one perceives when looking at the percent agreement figures.

One of the implications of these findings is that comparisons between studies using different strategies for computing peer acceptance must proceed with caution. Different strategies will result in different placement of children in popularity groupings and thus may radically change the groups being compared. It may be necessary to use more than one strategy and only include those children about whom there is a consensus regarding peer acceptance. This might be an acceptable strategy for clinical assessment where one would only want to identify those children truly in need of intervention. On the other hand, it would not be acceptable in studies of social skill development and peer acceptance since only extremely popular or unpopular children would be included in any individual study—thereby reducing sample size and failing to provide information about more typical levels of functioning.

Perhaps part of the difficulty arise from the way that sociometric ratings have been conceptualized. The result of such strategies as those examined in this study is to place children in discrete groups. This assumes a distinctiveness in peer acceptance such that there are clear qualitative differences between children described by labels such as

"popular", "neglected" or "rejected". It might be more accurate to consider peer acceptance a continuous rather than categorical variable. Perhaps children should be evaluated in terms of several dimensions of peer acceptance. Then rather than using peer acceptance as a categorical independent variable to group and compare children on other variables, other variables would be entered into regression equations in attempts to best predict scores on peer acceptance.

As it stands now, the choice of peer acceptance strategy seems to be determined by precedence and, to some extent, theoretical considerations regarding the major aspects of popularity. Further validation research is needed to see which, if any, of these strategies actually predicts choices by peers in free-play situations or individual children's satisfaction with their peer relations.

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Table 1

Computational Formalae Used

Yielding three groups (popular, unpopular and middle):

Most Play (MP) = high, middle or low on most-play nominations.

Best Friend (BF) = high, middle or low on best-friend nominations.

Preference (PR) = high, middle or low based on social preference (# most-play nominations minus # least-play nominations).

Liking (L) = mean rating on liking scale (smiling face rating = 3, neutral face = 2, and frowning face = 1).

Preference Placement (PP) = high, middle or low based on social preference using rating placement (# smiling face placements minus # frowning face placements).

Teacher Estimate of Liking (TRLIK) = high, middle or low on teacher estimate of how likeable peers would rate the child.

Teacher Estimate of Choices (TRCH) = high, middle or low on teacher estimates of how often child would be nominated as most-play choice.

Yielding four groups (popular, neglected, rejected or middle):

Nominations (N) = combining high and low on most-play and on least-play nominations (high on most-play plus low on least-play = popular; low on both = neglected; low on most-play and high on least-play = rejected; all others = middle).

Status Scores (M) = combination of social preference (# most-play minus # least play nominations) and social impact scores (# most-play plus # least-play nominations).

Play Status Scores (P) = combination of social preference and social impact scores using rating box placements (# of smiling and # frowning face placements).

Teacher Estimates of Status Score (TR) = combinations of teacher estimates of whether a child would be a most-play or a least-play choice by peers.

Table 2

Percent Agreement between Strategies Yielding Three Groups

	MP	BF	PP	PR	L	TRLIK	TRCH
MP	—	60.606	52.525	62.626	43.434	46.59	47.727
BF	—	—	49.494	49.5	46.465	39.77	39.773
PP	—	—	—	47.4	41.414	35.227	43.2
PR	—	—	—	—	37.373	48.863	47.727
L	—	—	—	—	—	38.64	37.5

Table 3

Percent Agreement between Strategies Yielding Four Groups

	N	M	P	TR
N	—	35.4	40.4	44.32
M	—	—	57.576	54.55
P	—	—	—	38.64

Table 4

Cohen's Kappa (and Z-Scores) for Strategies Yielding Three Groups

	MP	BF	PP	PR	L	TRLIK	TRCH
MP	—	.4064	.2846	.433	.1476	.1928	.2152
		(5.723)	(4.008)	(6.056)	(2.085)	(2.665)	(2.911)
BF	—	—	.194	.2389	.1984	.0794	.0873
			(2.724)	(3.365)	(2.818)	(1.078)	(1.161)
PP	—	—	—	.2085	.1228	.01	.1408
	—	—	—	(2.936)	(1.744)	(.1743)	(1.877)
PR	—	—	—	—	.0563	.236	.221
					(.7949)	(3.346)	(3.043)
L	—	—	—	—	—	.0930	.0719
						(1.331)	(.9871)

Table 5

Cohen's Kappa (and Z-Scores) for Strategies Yielding Four Groups

	N	M	P	TR
N	—	.0273	.0969	.0748
		(1.576)	(1.494)	(1.086)
M	—	—	.3577	.247
			(5.483)	(3.538)
P	—	—	—	.065
				(.893)